

Organizing for a Complex World: The Way Ahead

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What do we mean by “complexity”?

- **Different from “complicated”**
 - Large scale / multiple elements / non-linear
 - **Whole different than sum of parts**
 - Changes to (interaction of) elements cannot be accurately predicted
 - Integration brings additional capability not otherwise achievable
 - **Organizational politics internal to complexity**
 - Programs implemented in pluralist environment with divergent views
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It's pervasive...

- **Technology**
 - More sophisticated devices
 - High pace of change / innovation
 - **Environment: tactical / operational / strategic**
 - Platforms must be capable of multiple roles / missions
 - More elements / less predictability
 - **Organizations (public and private)**
 - Bigger
 - More constraints
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...and it's difficult

- **Staying on budget, on schedule and meeting requirements becomes harder**
- **Traditional approach (deconstruction) not applicable**
 - Too many moving parts and unclear relations between them
 - Too difficult to anticipate everything in advance
 - Lose added value from system-of-systems / net-centricity

It's just as much about governance and organization as it is about technology and engineering

A short history of governance models

	Arsenal	Contract	Weapon system manager	Private arsenal (outsourcing)	Lead System Integrator
Program requirements	Gov't	Gov't	Gov't	Gov't	Industry
Technical direction	Gov't	Gov't	Gov't	Industry	Industry
Program management	Gov't	Gov't	Industry	Industry	Industry
Technical execution	Gov't	Industry	Industry	Industry	Industry

Government does less, forgets how!

Source: Harvey Sapolsky (2009) "Models for Governing Large Systems Projects," in Guy Ben-Ari and Pierre Chao (eds.) *Organizing for a Complex World: Developing Tomorrow's Defense and Net-Centric Systems*, Washington, DC: CSIS, p. 26.

To govern and manage, you must measure

- **Premises:**
 - Complexity inhibits making design and production tradeoffs
 - The clash of ideas permits better tradeoffs, if an organization is flexible enough to allow and respond to it
 - Access to information promotes the clash
 - Cultivating & sharing information is prerequisite to making good tradeoffs
 - **Assess organization types for access to knowledge, ability to share it**
 - Compare organization types for ability to manage complex development programs
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Governance models today

	Government laboratory	Industry	FFRDC
Technical awareness	-	+	+
Project management skill	-	+	+ / -
Customer understanding	+ / -	+	+
Organizational longevity	+	-	+
Manufacturing expertise	-	+	-
Organizational independence	-	-	+

+ = strong performance; - = weak performance; +/- = mixed capabilities

Source: Eugene Gholz (2009) "Systems Integration for Complex Defense Projects," in Guy Ben-Ari and Pierre Chao (eds.) *Organizing for a Complex World: Developing Tomorrow's Defense and Net-Centric Systems*, Washington, DC: CSIS, p. 64.

Flexibility & resilience (F&R)

- **Address complexity by anticipating it**
 - Be ready for anything, not plan for everything
- **Build ‘fault-tolerant’ organizations**
 - Adapt and respond to anticipated, but unpredictable changes
- **Applicable at any stage, in any organization type**

Flexibility & resilience in various models

	Government laboratory	Industry	FFRDC / UARC
Flexibility	<ul style="list-style-type: none">• Range of collaborative efforts with academia and industry	<ul style="list-style-type: none">• Ability to manage relationships with customers as well as with partners / suppliers• Ability to attract talent• Strong (financial) incentive to adapt to changing conditions	<ul style="list-style-type: none">• Independence (incl. ability to verify performance) and lack of conflict of interest• Ability to retain talent• Work on long-term contracts• Institutional memory
Resilience	<ul style="list-style-type: none">• Long-term customer relationships• Organizational longevity	<ul style="list-style-type: none">• High level of customer understanding	<ul style="list-style-type: none">• Technical expertise across wide range of topics• Ability to attract talent

What's next?

- **Devise approach to measure flexibility and resilience across organization types**
 - FFRDC, UARC, government lab, private contractor
- **Consider applicability of private-sector approaches**
- **How to institute / cultivate / perpetuate F&R?**

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